

From: Callan, Richard
Sent: Friday, April 12, 2013 11:54 AM
To: Dr. Frederica Perera; Robin Whyatt
Cc: Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Louie, Nica
Subject: Confidential: "Key Issues" from EPA/OCSPP for Meeting
Attachments: columbia questions final clean.docx

Sensitivity: Confidential

Hi Ricky and Robin,

As discussed, EPA's Office of Chemical Safety and Pollution Prevention (OCSPP) has submitted to EPA's National Center for Environmental Research (NCER) a list of "key issues" about published findings from epidemiological studies at the EPA/NIEHS Columbia Center for Children's Environmental Health. I have been directed to provide this list to you and to schedule a visit for OCSPP to Columbia to discuss these issues with you and your colleagues. Staff from EPA's Office of Research and Development also plan to participate in this meeting.

Please let us know at your earliest convenience when the meeting can be scheduled. OCSPP has asked that we set a date for the meeting by next Wednesday, April 17th.

Best regards,

Rich

Rich Callan, MPH
Environmental Health Scientist
Health Research and Fellowships Division
National Center for Environmental Research
Office of Research and Development
U.S. Environmental Protection Agency
Phone: 703-347-8051 Fax: 703-347-8140

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US EPA, 2777 South Crystal Drive (Potomac Yard One), Room S-11937, Arlington, VA 22202

Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P,
Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

Columbia University Epidemiology Studies

The agency is obligated to review and address peer review comments in support of regulatory decisions. The following is a list of key issues about the epidemiological studies carried out by researchers at Columbia University that were raised in peer review comments. These issues require EPA to have access to the raw data for additional analyses by the agency.

- 1) Further analysis of other chemical exposures (*e.g.*, lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes
 - **2012 SAP** -- "it should be noted that it cannot be stated that chlorpyrifos is the sole contributor to the observed outcomes."
 - **2012 SAP** -- "In an earlier examination of the same cohort, Perera *et al.* (2009) reported an association between a decrease in full-scale IQ and verbal IQ in 5-year-olds with prenatal polycyclic aromatic hydrocarbons (PAH) exposure rather than chlorpyrifos, thus, raising an issue of the shift in chemical exposure association with increase in age. In each of these analyses, statistical modeling showed that the exposures were independently associated with IQ, and no significant interaction was observed with the other chemical. While this is a statistically sound approach to determine independent responses, panel members noted that it is very difficult to identify the independent physiological effects of a single chemical in this type of multi-chemical exposure scenario."
 - **2012 Federal Peer Review** -- "even low levels of lead can impact neurodevelopment, and even that the observed neurobehavioral deficits are more pronounced at lower blood lead levels when compared with higher blood lead levels".
 - **2008 SAP** -- "In order to eliminate the possible causes of neurodevelopmental effects by other pesticides in the Columbia study, it is suggested that EPA should repeat the pre-post residential cancellation analysis done for chlorpyrifos using other pesticide measurements, such as malathion diacid (MDA), a specific metabolite of malathion. The outcomes from those additional analyses will either confirm or reject EPA's preliminary conclusion that chlorpyrifos is likely to play a role in the neurodevelopmental outcomes."
 - **2008 SAP** -- ""It would be useful to examine the results of a statistical analysis that includes all three AChE-inhibiting insecticides in the analysis model as dichotomous variables (above or below LOD) in combination with continuous measurements for these variables. This type of analysis would likely not

change the results, but it could be helpful in illustrating threshold or dose response effects.”

2) Further analysis and information to address and, if possible, better characterize uncertainty around outcome measures on learning/memory/IQ

- **2012 SAP**-- Alternative considerations for non-quantified samples: “little use was made of techniques to integrate non-quantified samples into the statistical test.... Various methods were reviewed by the July 2010 SAP that can be applied to either normally or lognormally distributed data that include a significant (even a majority) of non-detectable sample Specifically, the use of ‘probability plots’ was described that can yield an estimate of the geometric mean of the distribution [GM], the geometric standard deviation [GSD], and corresponding percentiles.”
- **Federal Peer Review** -- “There is a scatterplot showing the raw scores for overall IQ and for each of the subtests, but it is not possible to obtain the necessary information to compare the distributions of these scores with the norms for the test or with any other study sample. Ideally, the means and standard deviations for these scores should be presented for either a non-exposed or a non-exposed combined with low exposed group and these should be compared to a moderate or high-exposed group as was done for the BSID-II in the Rauh et al., 2006 paper. Here the uncertainties stem from the assumptions that are made when regression analyses are performed. The main issue here is that outliers can greatly influence the slope of the function.”
- **Federal Peer Review**--A between group analysis using inferential statistics, as was done for the Bayley Scales of Infant Development II in the Rauh et al., 2006 paper, should be performed on each variable in both studies (i.e., the Child Behavior Checklist in Rauh et al., 2006, and the full scale IQ and subscales for the WISC-IV in the Rauh et al., 2011 study). This would be the most direct and least problematic method for determining whether exposure to chlorpyrifos resulted in significant decreases in IQ or significant increases in behavioral problems “..... no information was provided regarding the qualifications of the individuals who administered and scored the tests. “

3) Further analysis to assess, if possible, whether individual cohort members had the potential for exposure to chlorpyrifos and/or other acetylcholinesterase (AChE) inhibiting pesticides (e.g., diazinon, propoxur), prenatally and /or post-natally, at

levels leading to greater than 10% AChE inhibition (the level used to derive the regulatory point of departure).

- **2012 SAP**-- recommended conducting a dose reconstruction analysis—"data on the concentration of chlorpyrifos in various media (*i.e.* house dust, air and water) while market basket data exists on the concentration of chlorpyrifos on food. These data provide the main tools for developing an effective exposure assessment and a subsequent reconstruction of potential dose." The agency has begun such analysis but the current draft analysis is limited without data on the exposure information relevant to individual women such that environmental chlorpyrifos exposure can then be linked to measures of blood chlorpyrifos.
- **2012 SAP**-- recommended the agency consider issues related to multiple chemical exposure (*i.e.*, mixtures) to chlorpyrifos and other key AChE inhibiting pesticides identified by the Columbia University studies (diazinon, propoxur). Assumptions of co-exposure will likely be grossly overestimated without access to the raw data; such raw data may enable the agency to evaluate actual co-exposure information for individuals from air monitoring samples and blood samples.

From: Winner, Darrell
Sent: Tuesday, April 16, 2013 3:56 PM
To: Zarba, Christopher; Dellarco, Vicki; Christensen, Carol; Miller, David
Cc: Housenger, Jack; Callan, Richard
Subject: Trip to Columbia

Rich Callan is working to schedule a meeting with Columbia Childrens Center investigators to discuss OCSPP's key issues. Columbia has offered 2-5 p.m. on May 1 as their preferred option. Does that work for you?

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Monday, 5/6, 9 a.m.-12 p.m.

Thursday, 5/9, 9 a.m.-12 p.m.

Let me know if these days are possible for you.

-darrell

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
Environmental Protection Agency
(703) 347-0210

From: Zarba, Christopher
Sent: Tuesday, April 16, 2013 4:39 PM
To: Winner, Darrell; Dellarco, Vicki; Christensen, Carol; Miller, David
Cc: Housenger, Jack; Callan, Richard
Subject: RE: Trip to Columbia

Monday the 6th is out for me. Have a SAB review.

Christopher S. Zarba

US EPA Science Advisory Board
zarba.christopher@epa.gov
O (202) 564-0760
C (202) 731-6423

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David

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To: Winner, Darrell; Zarba, Christopher; Christensen, Carol; Miller, David
Cc: Housenger, Jack; Callan, Richard
Subject: RE: Trip to Columbia

May 1st will not work for me. May 6th is best.

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Acting Deputy Director

National Center for Environmental Research

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From: Miller, David
Sent: Tuesday, April 16, 2013 6:18 PM
To: Miller, David; Dellarco, Vicki; Winner, Darrell; Zarba, Christopher; Christensen, Carol
Cc: Housenger, Jack; Callan, Richard
Subject: RE: Trip to Columbia

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From: Dellarco, Vicki
Sent: Tuesday, April 16, 2013 6:28 PM
To: Miller, David; Winner, Darrell; Zarba, Christopher; Christensen, Carol
Cc: Housenger, Jack; Callan, Richard
Subject: Re: Trip to Columbia

May 9th is ok for me.

From: Miller, David
Sent: Tuesday, April 16, 2013 6:18:19 PM
To: Miller, David; Dellarco, Vicki; Winner, Darrell; Zarba, Christopher; Christensen, Carol
Cc: Housenger, Jack; Callan, Richard
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Let me know if these days are possible for you.

-darrell

Darrell Winner, Ph.D.

Acting Deputy Director

National Center for Environmental Research

Environmental Protection Agency

(703) 347-0210

From: Christensen, Carol
Sent: Wednesday, April 17, 2013 7:51 AM
To: Miller, David; Dellarco, Vicki; Winner, Darrell; Zarba, Christopher
Cc: Housenger, Jack; Callan, Richard
Subject: RE: Trip to Columbia

May 9th works for me. Carol

From: Miller, David
Sent: Tuesday, April 16, 2013 5:50 PM
To: Dellarco, Vicki; Winner, Darrell; Zarba, Christopher; Christensen, Carol
Cc: Housenger, Jack; Callan, Richard
Subject: RE: Trip to Columbia

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Acting Deputy Director

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From: Winner, Darrell
Sent: Wednesday, April 17, 2013 9:06 AM
To: Callan, Richard
Subject: RE: Trip to Columbia -- May 6th and May 9th won't work for Columbia after all

Get the alternate dates to OCSPP as soon as possible.

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research Environmental Protection Agency
(703) 347-0210

-----Original Message-----

From: Callan, Richard
Sent: Tuesday, April 16, 2013 6:39 PM
To: Winner, Darrell
Subject: RE: Trip to Columbia -- May 6th and May 9th won't work for Columbia after all

I just heard back from the Columbia researchers -- it looks like some of them have conflicts on May 6th and May 9th so neither of those dates will work for them after all. I am still waiting to hear about Thursday, May 2nd. They are sending around another Doodle poll for all of May to see what other dates may work.

Rich

Rich Callan, MPH
Environmental Health Scientist
Health Research and Fellowships Division National Center for Environmental Research Office of Research and Development U.S. Environmental Protection Agency
Phone: 703-347-8051 Fax: 703-347-8140

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-darrell

Darrell Winner, Ph.D.

Acting Deputy Director

National Center for Environmental Research

Environmental Protection Agency

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Callan, Richard

From: Housenger, Jack
Sent: Wednesday, April 17, 2013 10:01 AM
To: Winner, Darrell; Zarba, Christopher; Dellarco, Vicki; Christensen, Carol; Miller, David
Cc: Callan, Richard
Subject: RE: Trip to Columbia

So it appears the 9th is the day of choice, right?
I'd like to be able to say the day is set so our lawyer can report that to the petitioners
Please let me know that this is the day
thanks

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Callan, Richard

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Sent: Wednesday, April 17, 2013 11:51 AM
To: Miller, David; Callan, Richard; Housenger, Jack; Winner, Darrell; Zarba, Christopher; Christensen, Carol
Subject: RE: Trip to Columbia

I am willing also

-----Original Message-----

From: Miller, David
Sent: Wednesday, April 17, 2013 10:39 AM
To: Callan, Richard; Housenger, Jack; Winner, Darrell; Zarba, Christopher; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

I don't know about everybody else, but if it helps I am comfortable getting a 6 am train from Union Station to make a morning meeting time with Columbia on 5/9.

David

From: Callan, Richard
Sent: Wednesday, April 17, 2013 10:26 AM
To: Housenger, Jack; Winner, Darrell; Zarba, Christopher; Dellarco, Vicki; Christensen, Carol; Miller, David
Subject: RE: Trip to Columbia

As of this morning, Columbia has informed us that meeting after 11:00 a.m. or in the afternoon on 5/6 or 5/9 will not work for everyone. They are now actively looking for other alternate dates and expect to send those later today.

Rich

Rich Callan, MPH

Environmental Health Scientist

Health Research and Fellowships Division

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From: Housenger, Jack

Sent: Wednesday, April 17, 2013 10:01 AM

To: Winner, Darrell; Zarba, Christopher; Dellarco, Vicki; Christensen, Carol; Miller, David

Cc: Callan, Richard

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Sent: Wednesday, April 17, 2013 4:36 PM
To: Callan, Richard; Winner, Darrell; Zarba, Christopher; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
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Both 5/14 and 5/15 are ok with me.

David

From: Callan, Richard
Sent: Wednesday, April 17, 2013 4:27 PM
To: Winner, Darrell; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
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Columbia says after checking everyone's schedules 5/9 will not be possible for them. They say 5/14 at 12 noon or 5/15 at 11 am or 12 noon might be possible, they are waiting to hear from one more key colleague who is not available today. They have been trying to reach him but we might have to wait until tomorrow.

Rich

From: Winner, Darrell
Sent: Wednesday, April 17, 2013 3:51:49 PM
To: Zarba, Christopher; Miller, David; Callan, Richard; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
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While I will miss my beauty sleep, I can do it also well.

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
Environmental Protection Agency
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From: Zarba, Christopher
Sent: Wednesday, April 17, 2013 3:46 PM
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That works for me also. Lets do it....

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From: Winner, Darrell
Sent: Tuesday, April 16, 2013 3:56 PM
To: Zarba, Christopher; Dellarco, Vicki; Christensen, Carol; Miller, David

Cc: Housenger, Jack; Callan, Richard
Subject: Trip to Columbia

Rich Callan is working to schedule a meeting with Columbia Childrens Center investigators to discuss OCSP's key issues. Columbia has offered 2-5 p.m. on May 1 as their preferred option. Does that work for you?

They sent these possible alternate dates/times -- we have asked if we can push up the times to after 12 noon each day and are waiting on a response.

Thursday, 5/2, 9 a.m.-12 p.m.

Monday, 5/6, 9 a.m.-12 p.m.

Thursday, 5/9, 9 a.m.-12 p.m.

Let me know if these days are possible for you.

-darrell

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
Environmental Protection Agency
(703) 347-0210

From: Miller, David
Sent: Thursday, April 18, 2013 9:50 AM
To: Callan, Richard; Zarba, Christopher; Winner, Darrell; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

All the dates/times below are ok for me.

From: Callan, Richard
Sent: Thursday, April 18, 2013 9:47 AM
To: Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: Re: Trip to Columbia

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.

Wednesday, 5/15--11 a.m.-2 p.m. or 12-3 p.m.

Thursday, 5/23--11 a.m.-2 p.m.

Rich

From: Winner, Darrell
Sent: Thursday, April 18, 2013 9:52 AM
To: Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

I could go any of those dates.

Darrell Winner, Ph.D.
Acting Deputy Director
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From: Callan, Richard
Sent: Thursday, April 18, 2013 9:47 AM
To: Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: Re: Trip to Columbia
Importance: High

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.
Wednesday, 5/15--11 a.m.-2 p.m. or 12-3 p.m.
Thursday, 5/23--11 a.m.-2 p.m.

Rich

From: Christensen, Carol
Sent: Thursday, April 18, 2013 2:42 PM
To: Callan, Richard
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Weds. is my preference

From: Callan, Richard
Sent: Thursday, April 18, 2013 2:37 PM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Carol filled out the Doodle and says either of these dates is OK, we still haven't heard from Chris or Jack regarding Tuesday, May 14th or Wednesday, May 15th dates -- could you both reply back ASAP so we can let Columbia know? For all, if both of these dates and times are OK, is there any preference of Tuesday or Wednesday?

Rich

Rich Callan, MPH
Environmental Health Scientist
Health Research and Fellowships Division
National Center for Environmental Research
Office of Research and Development
U.S. Environmental Protection Agency
Phone: 703-347-8051 Fax: 703-347-8140

From: Callan, Richard
Sent: Thursday, April 18, 2013 11:12 AM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- May 14th or 15th -- Doodle Poll

I have set up a Doodle poll for this since we have yet to hear from several people. The 23rd is off the table since Vicki can't make that date. I filled in entries for those who have already responded. You can go to this link or reply back to all.

<http://www.doodle.com/ns33wfc93ncnsncz#table>

Rich

Rich Callan, MPH
Environmental Health Scientist

Health Research and Fellowships Division
National Center for Environmental Research
Office of Research and Development
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Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P,
Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

From: Dellarco, Vicki
Sent: Thursday, April 18, 2013 10:15 AM
To: Winner, Darrell; Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Christensen, Carol
Subject: RE: Trip to Columbia

14 and 15 works but 5/23 will not work for me; My daughter's college graduation. Sorry

From: Winner, Darrell
Sent: Thursday, April 18, 2013 9:52 AM
To: Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

I could go any of those dates.

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
Environmental Protection Agency
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From: Callan, Richard
Sent: Thursday, April 18, 2013 9:47 AM
To: Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: Re: Trip to Columbia
Importance: High

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.
Wednesday, 5/15--11 a.m.-2 p.m. or 12-3 p.m.
Thursday, 5/23--11 a.m.-2 p.m.

Rich

From: Dellarco, Vicki
Sent: Thursday, April 18, 2013 2:54 PM
To: Callan, Richard; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Either date is fine with me.

From: Callan, Richard
Sent: Thursday, April 18, 2013 2:37 PM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Carol filled out the Doodle and says either of these dates is OK, we still haven't heard from Chris or Jack regarding Tuesday, May 14th or Wednesday, May 15th dates -- could you both reply back ASAP so we can let Columbia know? For all, if both of these dates and times are OK, is there any preference of Tuesday or Wednesday?

Rich

Rich Callan, MPH
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Health Research and Fellowships Division
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U.S. Environmental Protection Agency
Phone: 703-347-8051 Fax: 703-347-8140

From: Callan, Richard
Sent: Thursday, April 18, 2013 11:12 AM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- May 14th or 15th -- Doodle Poll

I have set up a Doodle poll for this since we have yet to hear from several people. The 23rd is off the table since Vicki can't make that date. I filled in entries for those who have already responded. You can go to this link or reply back to all.

<http://www.doodle.com/ns33wfc93ncnsncz#table>

Rich

Rich Callan, MPH
Environmental Health Scientist
Health Research and Fellowships Division
National Center for Environmental Research
Office of Research and Development
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Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P,
Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

From: Dellarco, Vicki
Sent: Thursday, April 18, 2013 10:15 AM
To: Winner, Darrell; Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Christensen, Carol
Subject: RE: Trip to Columbia

14 and 15 works but 5/23 will not work for me; My daughter's college graduation. Sorry

From: Winner, Darrell
Sent: Thursday, April 18, 2013 9:52 AM
To: Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

I could go any of those dates.

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
Environmental Protection Agency
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From: Callan, Richard
Sent: Thursday, April 18, 2013 9:47 AM
To: Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: Re: Trip to Columbia
Importance: High

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.
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Thursday, 5/23--11 a.m.-2 p.m.

From: Zarba, Christopher
Sent: Thursday, April 18, 2013 3:05 PM
To: Callan, Richard; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Either works for me.

Christopher S. Zarba

US EPA Science Advisory Board
zarba.christopher@epa.gov
O (202) 564-0760
C (202) 731-6423

From: Callan, Richard
Sent: Thursday, April 18, 2013 2:37 PM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Carol filled out the Doodle and says either of these dates is OK, we still haven't heard from Chris or Jack regarding Tuesday, May 14th or Wednesday, May 15th dates -- could you both reply back ASAP so we can let Columbia know? For all, if both of these dates and times are OK, is there any preference of Tuesday or Wednesday?

Rich

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National Center for Environmental Research
Office of Research and Development
U.S. Environmental Protection Agency
Phone: 703-347-8051 Fax: 703-347-8140

From: Callan, Richard
Sent: Thursday, April 18, 2013 11:12 AM
To: Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David
Subject: RE: Trip to Columbia -- May 14th or 15th -- Doodle Poll

I have set up a Doodle poll for this since we have yet to hear from several people. The 23rd is off the table since Vicki can't make that date. I filled in entries for those who have already responded. You can go to this link or reply back to all.

<http://www.doodle.com/ns33wfc93ncnsncz#table>

Rich

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Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

From: Dellarco, Vicki
Sent: Thursday, April 18, 2013 10:15 AM
To: Winner, Darrell; Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Christensen, Carol
Subject: RE: Trip to Columbia

14 and 15 works but 5/23 will not work for me; My daughter's college graduation. Sorry

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Sent: Thursday, April 18, 2013 9:52 AM
To: Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: RE: Trip to Columbia

I could go any of those dates.

Darrell Winner, Ph.D.
Acting Deputy Director
National Center for Environmental Research
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From: Callan, Richard
Sent: Thursday, April 18, 2013 9:47 AM
To: Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol
Subject: Re: Trip to Columbia
Importance: High

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.

Wednesday, 5/15--11 a.m.-2 p.m. or 12-3 p.m.

Thursday, 5/23--11 a.m.-2 p.m.

Rich

From: Payne-Sturges, Devon
Sent: Thursday, April 18, 2013 3:20 PM
To: Callan, Richard
Subject: RE: Trip to Columbia -- Wednesday, May 15th, 12:00 pm - 3:00 pm OK?

Good job.
-D

~~~~~  
Devon C. Payne-Sturges, DrPH  
Assistant Center Director for Human Health  
ORD/ National Center for Environmental Research  
email:payne-sturges.devon@epa.gov  
Phone: 703 347-8055 | New Fax: 703 347-8140

Mailing Address  
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Office Address for Fedex, Express Mail or Courier  
2777 Crystal Drive (one Potomac Yard), Room S-11784  
Arlington, VA 22202

Learn about us!  
<http://www.epa.gov/ncer/ehs>

'Integrity is the source of every power we have as scientists.'  
-P. Frumhoff

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**From:** Callan, Richard  
**Sent:** Thursday, April 18, 2013 3:14 PM  
**To:** Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 pm - 3:00 pm OK?

OK then since at least one person has a preference let's go with Wednesday, May 15th from 12:00 p.m. - 3:00 p.m. If anyone else has a different preference please let me know by COB today, otherwise I will confirm that date/time with Columbia.

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division  
National Center for Environmental Research  
Office of Research and Development  
U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

**From:** Zarba, Christopher  
**Sent:** Thursday, April 18, 2013 3:04 PM  
**To:** Callan, Richard; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David  
**Subject:** RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Either works for me.

*Christopher S. Zarba*

US EPA Science Advisory Board  
zarba.christopher@epa.gov  
O (202) 564-0760  
C (202) 731-6423

---

**From:** Callan, Richard  
**Sent:** Thursday, April 18, 2013 2:37 PM  
**To:** Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David  
**Subject:** RE: Trip to Columbia -- Tuesday, May 14th or Wednesday, May 15th

Carol filled out the Doodle and says either of these dates is OK, we still haven't heard from Chris or Jack regarding Tuesday, May 14th or Wednesday, May 15th dates -- could you both reply back ASAP so we can let Columbia know? For all, if both of these dates and times are OK, is there any preference of Tuesday or Wednesday?

Rich

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**From:** Callan, Richard  
**Sent:** Thursday, April 18, 2013 11:12 AM  
**To:** Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Winner, Darrell; Miller, David  
**Subject:** RE: Trip to Columbia -- May 14th or 15th -- Doodle Poll

I have set up a Doodle poll for this since we have yet to hear from several people. The 23rd is off the table since Vicki can't make that date. I filled in entries for those who have already responded. You can go to this link or reply back to all.

<http://www.doodle.com/ns33wfc93ncnsncz#table>

Rich

---

Rich Callan, MPH



Environmental Health Scientist  
Health Research and Fellowships Division  
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Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P,  
Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

---

**From:** Dellarco, Vicki  
**Sent:** Thursday, April 18, 2013 10:15 AM  
**To:** Winner, Darrell; Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Christensen, Carol  
**Subject:** RE: Trip to Columbia

14 and 15 works but 5/23 will not work for me; My daughter's college graduation. Sorry

---

**From:** Winner, Darrell  
**Sent:** Thursday, April 18, 2013 9:52 AM  
**To:** Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol  
**Subject:** RE: Trip to Columbia

I could go any of those dates.

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research  
Environmental Protection Agency  
(703) 347-0210

---

**From:** Callan, Richard  
**Sent:** Thursday, April 18, 2013 9:47 AM  
**To:** Zarba, Christopher; Winner, Darrell; Miller, David; Housenger, Jack; Dellarco, Vicki; Christensen, Carol  
**Subject:** Re: Trip to Columbia  
**Importance:** High

OK Columbia has just sent 3 dates which are definitely possible for all of them. Please confirm if any of these are possible for EPA as well. We can do a Doodle poll if necessary.

Tuesday, 5/14--11 a.m.-2 p.m.  
Wednesday, 5/15--11 a.m.-2 p.m. or 12-3 p.m.  
Thursday, 5/23--11 a.m.-2 p.m.

Rich

**From:** Callan, Richard  
**Sent:** Friday, April 19, 2013 11:52 AM  
**To:** Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Miller, David  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED  
**Importance:** High

Hi All,

We have confirmed the date and time for the meeting with Columbia. The meeting is scheduled as follows:

**Date:** Wednesday, May 15<sup>th</sup>  
**Time:** 12:00 – 3:00 p.m.  
**Location:** Columbia University, Mailman School of Public Health  
722 West 168<sup>th</sup> Street, 11<sup>th</sup> floor, EHS Conference Room 1101  
New York, NY 10032  
**Map:** <http://goo.gl/maps/HVrbW>  
**Contact number:** (212) 304-7280

**Transportation:** From Union Station, DC to Penn Station, NYC  
Amtrak <http://tickets.amtrak.com/itd/amtrak>  
As of this morning, there is an 8:00 a.m. Acela train from Union Station scheduled to arrive at 10:46 a.m. and the current fare is \$199. There is a 7:25 a.m. regular train scheduled to arrive at 10:44 a.m. with a \$49 fare and an 8:10 a.m. regular train scheduled to arrive at 11:21 a.m. with an \$82 fare (the fares can change at any time depending on how many seats are remaining).

**Penn Station to Meeting Location:**

It would be good to allow at least 45 minutes to get from Penn Station to 168<sup>th</sup> Street by taxi or subway. The taxi would go via the West Side Highway and the 168<sup>th</sup> Street subway stop (via the A, C or 1 train) is about 2 blocks from the building where the meeting room is located.

Subway – MTA website:

[http://tripplanner.mta.info/MyTrip/ui\\_web/customplanner/tripplanner.aspx](http://tripplanner.mta.info/MyTrip/ui_web/customplanner/tripplanner.aspx)

Best regards,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
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20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

**From:** Christensen, Carol  
**Sent:** Monday, April 22, 2013 5:34 PM  
**To:** Miller, David; Callan, Richard; Winner, Darrell; Zarba, Christopher; Housenger, Jack; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

This plan sounds fine to me. Thanks David.

---

**From:** Miller, David  
**Sent:** Monday, April 22, 2013 5:27 PM  
**To:** Callan, Richard; Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

I would recommend the 7:25 a.m. regular train scheduled to arrive at 10:44 a.m. with a \$49 fare.

There is a (big) cost difference between the Acela and the regular train but only a (small) time difference.

I think this should be done soon, as I might expect the \$49 to go up as we get closer to the date.

If we can agree (soon) on the train, HED can start the TA's.

David

---

**From:** Callan, Richard  
**Sent:** Friday, April 19, 2013 11:52 AM  
**To:** Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Miller, David  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED  
**Importance:** High

Hi All,

We have confirmed the date and time for the meeting with Columbia. The meeting is scheduled as follows:

**Date:** Wednesday, May 15<sup>th</sup>  
**Time:** 12:00 – 3:00 p.m.  
**Location:** Columbia University, Mailman School of Public Health  
722 West 168<sup>th</sup> Street, 11<sup>th</sup> floor, EHS Conference Room 1101  
New York, NY 10032

**Map:** <http://goo.gl/maps/HVrbW>  
**Contact number:** (212) 304-7280

**Transportation:** From Union Station, DC to Penn Station, NYC  
Amtrak <http://tickets.amtrak.com/itd/amtrak>  
As of this morning, there is an 8:00 a.m. Acela train from Union Station scheduled to arrive at 10:46 a.m. and the current fare is \$199. There is a 7:25 a.m. regular train scheduled to arrive at

10:44 a.m. with a \$49 fare and an 8:10 a.m. regular train scheduled to arrive at 11:21 a.m. with an \$82 fare (the fares can change at any time depending on how many seats are remaining).

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Best regards,

Rich

---

Rich Callan, MPH  
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National Center for Environmental Research <http://www.epa.gov/ncer/>

**From:** Winner, Darrell  
**Sent:** Tuesday, April 23, 2013 10:12 AM  
**To:** Callan, Richard; Zarba, Christopher; Miller, David; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

Me too

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research  
Environmental Protection Agency  
(703) 347-0210

---

**From:** Callan, Richard  
**Sent:** Tuesday, April 23, 2013 9:59 AM  
**To:** Zarba, Christopher; Miller, David; Winner, Darrell; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** Re: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

OK with me.

Rich

---

**From:** Zarba, Christopher  
**Sent:** Tuesday, April 23, 2013 9:53:13 AM  
**To:** Miller, David; Callan, Richard; Winner, Darrell; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

I agree. Big cost difference / little time difference..

*Christopher S. Zarba*

US EPA Science Advisory Board  
[zarba.christopher@epa.gov](mailto:zarba.christopher@epa.gov)  
O (202) 564-0760  
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**From:** Miller, David  
**Sent:** Monday, April 22, 2013 5:27 PM  
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I think this should be done soon, as I might expect the \$49 to go up as we get closer to the date.

If we can agree (soon) on the train, HED can start the TA's.

David

---

**From:** Callan, Richard

**Sent:** Friday, April 19, 2013 11:52 AM

**To:** Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki; Miller, David

**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica

**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

**Importance:** High

Hi All,

We have confirmed the date and time for the meeting with Columbia. The meeting is scheduled as follows:

Date: Wednesday, May 15<sup>th</sup>  
Time: 12:00 – 3:00 p.m.  
Location: Columbia University, Mailman School of Public Health  
722 West 168<sup>th</sup> Street, 11<sup>th</sup> floor, EHS Conference Room 1101  
New York, NY 10032  
Map: <http://goo.gl/maps/HVrbW>  
Contact number: (212) 304-7280

Transportation: From Union Station, DC to Penn Station, NYC  
Amtrak <http://tickets.amtrak.com/itd/amtrak>  
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Best regards,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division  
National Center for Environmental Research  
Office of Research and Development  
U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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Callan, Richard

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**From:** Miller, David  
**Sent:** Tuesday, April 23, 2013 10:32 AM  
**To:** Winner, Darrell; Callan, Richard; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
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**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

Me too

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research  
Environmental Protection Agency  
(703) 347-0210

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**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
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OK with me.

Rich

**From:** Zarba, Christopher

**Sent:** Tuesday, April 23, 2013 9:53:13 AM

**To:** Miller, David; Callan, Richard; Winner, Darrell; Housenger, Jack; Christensen, Carol; Dellarco, Vicki

**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica

**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

I agree. Big cost difference / little time difference..

*Christopher S. Zarba*

US EPA Science Advisory Board

[zarba.christopher@epa.gov](mailto:zarba.christopher@epa.gov)

O (202) 564-0760

C (202) 731-6423

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**From:** Miller, David

**Sent:** Monday, April 22, 2013 5:27 PM

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OK with me.

Rich

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I agree. Big cost difference / little time difference..

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**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED  
**Importance:** High

Hi All,

We have confirmed the date and time for the meeting with Columbia. The meeting is scheduled as follows:

Thank you,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
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Ok. We are finding out now about return tickets (cost, times, etc.). Ideally, we can all get a cheap return that doesn't necessarily hold us to only one departure (like a plane ticket does), but rather allows us to catch "the next" train back to DC.

Looking into that now.

But we will, like all of you, go up with the 7:25 a.m. regular train on May 15 scheduled to arrive at 10:44 a.m. with a \$49 fare.

David

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**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

Me too

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research

**From:** Winner, Darrell  
**Sent:** Tuesday, April 23, 2013 11:07 AM  
**To:** Callan, Richard  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED -- 7:25 a.m. train from DC

I can do my own travel. Check with Chris – he may want you to coordinate for him.

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research  
Environmental Protection Agency  
(703) 347-0210

---

**From:** Callan, Richard  
**Sent:** Tuesday, April 23, 2013 11:05 AM  
**To:** Winner, Darrell  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED -- 7:25 a.m. train from DC

OK sounds good, thank you for letting me know. We would each do our own travel, correct? I haven't used OARS for any trips yet so I guess I can let them know we are coordinating with a group and see what they say.

Since Friday is my Compressed day I may stay on in NYC and work remotely that Thursday from there, if that's OK.

Rich

---

**From:** Winner, Darrell  
**Sent:** Tuesday, April 23, 2013 10:57 AM  
**To:** Callan, Richard  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED -- 7:25 a.m. train from DC

BTW- I think Chris wants to catch it at BWI

Darrell Winner, Ph.D.  
Acting Deputy Director  
National Center for Environmental Research  
Environmental Protection Agency  
(703) 347-0210

---

**From:** Callan, Richard  
**Sent:** Tuesday, April 23, 2013 10:54 AM  
**To:** Miller, David; Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED -- 7:25 a.m. train from DC  
**Importance:** High

OK sounds good. We haven't heard from everyone yet in your group if there is any other preference but if there are no objections by 12 noon today then let's confirm the 7:25 train and we'll make travel arrangements here too.

10:44 a.m. with a \$49 fare and an 8:10 a.m. regular train scheduled to arrive at 11:21 a.m. with an \$82 fare (the fares can change at any time depending on how many seats are remaining).

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Rich

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**From:** Zarba, Christopher  
**Sent:** Tuesday, April 23, 2013 11:35 AM  
**To:** Callan, Richard  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

Just let me know what the final decision is and I will book my train. Thanks.

*Christopher S. Zarba*

US EPA Science Advisory Board  
zarba.christopher@epa.gov  
O (202) 564-0760  
C (202) 731-6423

---

**From:** Callan, Richard  
**Sent:** Tuesday, April 23, 2013 11:16 AM  
**To:** Miller, David; Winner, Darrell; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm CONFIRMED

OK. It looks like as of today there are trains at 4:05 and 4:42 p.m. for \$49 arriving at 7:25 p.m. and 8:05 p.m. respectively, and a 5:39 p.m. arriving at 9:05 p.m. for \$82. Please do let us know about the "next train" option though, that sounds good.

<http://www.amtrak.com/home>

Rich

---

**Sent:** Tuesday, April 23, 2013 10:32 AM  
**To:** Winner, Darrell; Callan, Richard; Zarba, Christopher; Housenger, Jack; Christensen, Carol; Dellarco, Vicki  
**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
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David

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**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
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Me too

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**Cc:** Payne-Sturges, Devon; Li, Sylvana; Louie, Nica  
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Rich

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David

**From:** Christensen, Carol  
**Sent:** Friday, May 03, 2013 6:26 AM  
**To:** Callan, Richard; Miller, David; Dellarco, Vicki  
**Cc:** Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Zarba, Christopher; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Richard --

Yes, we have a draft agenda prepared. We will forward early next week after we have a chance to review and discuss as a group in HED.

Carol

---

**From:** Callan, Richard  
**Sent:** Thursday, May 02, 2013 6:40 PM  
**To:** Miller, David; Dellarco, Vicki; Christensen, Carol  
**Cc:** Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Zarba, Christopher; Louie, Nica  
**Subject:** Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Hello Drs. Miller, Dellarco and Christensen,

We need to send Columbia a draft agenda for the meeting that has been requested with them. Since I'm not sure what your specific agenda items are, could one of you please take the lead in putting together a draft agenda and sending it out to the group for comments? Then we can send to Columbia and see if it is agreeable to them as well.

Thank you,

Rich

---

Rich Callan, MPH  
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**From:** Callan, Richard  
**Sent:** Tuesday, May 07, 2013 2:01 PM  
**To:** rmw5@columbia.edu; "Callan, Richard" <Callan.Richard@epa.gov>; Anne Louise Oates  
**Cc:** Frederica Perera; var1@columbia.edu; Howard Andrews  
**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m.

Hi Robin,

As far as I know at this point, there will be 3 attendees from our Office of Pesticide Programs (OPP) plus 3 staff from the Office of Research and Development. This is the list of the people we expect:

From EPA OPP: Vicki Dellarco, David Miller, Carol Christensen From EPA ORD: Darrell Winner, Christopher Zarba (on 1-year detail as Director of the Science Advisory Board), Rich Callan

I have asked the OPP attendees to send a draft agenda in advance and they said they would send it when it is available. Please let me know if you have other questions and the room where we would expect to meet.

Best regards,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division National Center for Environmental Research Office of Research and Development U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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-----Original Message-----

From: rmw5@columbia.edu [mailto:rmw5@columbia.edu]  
Sent: Tuesday, May 07, 2013 1:33 PM  
To: "Callan, Richard" <Callan.Richard@epa.gov>; Anne Louise Oates  
Cc: Frederica Perera; var1@columbia.edu; Howard Andrews  
Subject: Re: Meeting with EPA

Hi Rich, the EPA meeting is coming up pretty soon so we were hoping you could get us a list of attendees. Among other things, we need to reserve appropriate space so need to know how many people are coming. Can you do that?? Thanks so much. Hope all is well. Best, Robin

Callan, Richard

---

**From:** Christensen, Carol  
**Sent:** Tuesday, May 07, 2013 3:12 PM  
**To:** Callan, Richard  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Yes, we are just meeting tomorrow morning on this. I will impress on the HED group that we need to communicate to the CCCEH folks quickly about this. Thanks

---

**From:** Callan, Richard  
**Sent:** Tuesday, May 07, 2013 2:02 PM  
**To:** Christensen, Carol  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Hi Carol,

Any progress on the draft agenda? We should send it to Columbia this week if possible.

Thanks,

Rich

---

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**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Richard --

Yes, we have a draft agenda prepared. We will forward early next week after we have a chance to review and discuss as a group in HED.

Carol

---

**From:** Callan, Richard  
**Sent:** Thursday, May 02, 2013 6:40 PM  
**To:** Miller, David; Dellarco, Vicki; Christensen, Carol  
**Cc:** Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Zarba, Christopher; Louie, Nica  
**Subject:** Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Hello Drs. Miller, Dellarco and Christensen,

We need to send Columbia a draft agenda for the meeting that has been requested with them. Since I'm not sure what your specific agenda items are, could one of you please take the lead in putting together a draft agenda and sending it out to the group for comments? Then we can send to Columbia and see if it is agreeable to them as well.

Thank you,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division  
National Center for Environmental Research  
Office of Research and Development  
U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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National Center for Environmental Research <http://www.epa.gov/ncer/>

Callan, Richard

---

**From:** Christensen, Carol  
**Sent:** Thursday, May 09, 2013 1:45 PM  
**To:** Callan, Richard  
**Cc:** Winner, Darrell; Housenger, Jack  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?  
**Attachments:** DRAFT Agenda April 2013\_5.docx

Rich –

Please find proposed agenda attached.

Thanks

Carol

---

**From:** Callan, Richard  
**Sent:** Thursday, May 09, 2013 12:37 PM  
**To:** Christensen, Carol  
**Cc:** Winner, Darrell  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Hi Carol,

Any progress on the draft agenda items? I think it would be a good idea to send something to Columbia this week so they have a chance to see if they want to add anything and can be prepared for the meeting next Wednesday. If I can help facilitate this please let me know.

Thanks and best regards,

Rich

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**From:** Callan, Richard  
**Sent:** Tuesday, May 07, 2013 3:16 PM  
**To:** Christensen, Carol  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Sounds good, Carol, thank you.

Rich

---

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**Sent:** Tuesday, May 07, 2013 3:12 PM  
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Rich

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**From:** Christensen, Carol  
**Sent:** Friday, May 03, 2013 6:26 AM  
**To:** Callan, Richard; Miller, David; Dellarco, Vicki  
**Cc:** Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Zarba, Christopher; Louie, Nica  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Richard --

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**To:** Miller, David; Dellarco, Vicki; Christensen, Carol  
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Agenda 5/15/13 Meeting with CCCEH Investigators and Research Staff regarding EPA Chlorpyrifos Human Health Risk Assessment Information Needs

Introductions

- 1) Relevance and Importance of CCCEH Data to EPA Human Health Risk Assessment
- 2) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (Please refer to EPA Questions sent April 2013)
- 3) Wrap-Up and Next Steps

Callan, Richard

---

**From:** Christensen, Carol  
**Sent:** Thursday, May 09, 2013 3:02 PM  
**To:** Callan, Richard  
**Cc:** Winner, Darrell; Housenger, Jack  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Rich

Last summer, HED initiated a Federal external review to solicit expert input regarding the Columbia MRI study, and to address some of the outstanding concerns raised at the SAP about the neurodevelopment testing. Recall the MRI study was published a few weeks after the FIFRA SAP (April 2012) so that study was not included in the review. We received input from Federal scientists (NIH, FDA, CDC) with expertise in MRI interpretation, neurodevelopment testing protocols and environmental epidemiology concerning our questions. Both the EPA questions and responses will (although not at this time) be placed into the docket and we can share with Columbia next week if asked.

Thanks

Carol

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**From:** Callan, Richard  
**Sent:** Thursday, May 09, 2013 2:01 PM  
**To:** Christensen, Carol  
**Cc:** Winner, Darrell; Housenger, Jack  
**Subject:** RE: Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

Hi Carol,

Looks good, thank you. Question – the “external review” is mentioned here and in the questions. Could you provide at least some information about this review so that Columbia can understand what it is?

Best regards,

Rich

---

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**Cc:** Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon; Zarba, Christopher; Louie, Nica  
**Subject:** Trip to Columbia -- Wednesday, May 15th, 12:00 - 3:00 pm -- Agenda items?

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Thank you,

Rich

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**From:** Howard Andrews <Andrews@nyspi.columbia.edu>  
**Sent:** Friday, May 10, 2013 8:41 PM  
**To:** Callan, Richard; rmw5@columbia.edu; Frederica Perera; Anne Louise Oates  
**Cc:** var1@columbia.edu; Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon  
**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda

Hi Rich,

Thank you for the agenda and for the information about the "external review". Just to clarify: two of the items in the document that was sent on April 12th refer to a "federal review" and one item refers to a "2012 federal review". Are these three items that came out of the "external review" referred to in your e-mail? That is, do all of these terms refer to the same process? We are seeking clarification because prior to your e-mail, we were unaware that the external review you describe had taken place.

In order for us to be able to discuss issues related to the external review, we will need to have a copy of the entire list of EPA questions and all responses provided by the external reviewers. Also, can you please tell us: a) who served on the external review panel, b) the affiliations and job titles of these individuals, and c) the date that the panel was convened, and the date the panel's report was issued?

In response to your invitation, we would like to add two items to the agenda:

- 1) Review of Columbia responses to previous EPA queries, invited presentations made to EPA, and participation in SAPs
- 2) Epidemiological assessment of pesticide effects: overview

And a last request: can you please provide the job titles of each of the individuals who will be coming to the meeting next week?

Thanks,  
Howard

Howard F. Andrews, PhD

Associate Clinical Professor of Biostatistics Director, Data Coordinating Center Columbia University Medical Center  
(212) 543 6022

---

From: Callan, Richard [Callan.Richard@epa.gov]  
Sent: Thursday, May 09, 2013 5:35 PM  
To: rmw5@columbia.edu; Frederica Perera; Anne Louise Oates  
Cc: var1@columbia.edu; Howard Andrews; Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda

Hi Robin,

We have been sent a draft agenda from OCSPP for next Wednesday's meeting and it is attached. Please let us know if there are any items that you would like to add.

The agenda and the questions that were sent earlier include a reference to an "external review." Carol Christensen at OCSPP says this was conducted to address some of the outstanding concerns raised at the SAP meeting about the neurodevelopment testing and questions regarding the MRI publication which became available after the meeting. She says the EPA questions and responses they received will soon be available in the public docket.

Best regards,

Rich

---

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-----Original Message-----

From: Callan, Richard

Sent: Tuesday, May 07, 2013 2:01 PM

To: [rmw5@columbia.edu](mailto:rmw5@columbia.edu); "Callan, Richard" <[Callan.Richard@epa.gov](mailto:Callan.Richard@epa.gov)>; Anne Louise Oates

Cc: Frederica Perera; [var1@columbia.edu](mailto:var1@columbia.edu); Howard Andrews

Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m.

Hi Robin,

As far as I know at this point, there will be 3 attendees from our Office of Pesticide Programs (OPP) plus 3 staff from the Office of Research and Development. This is the list of the people we expect:

From EPA OPP: Vicki Dellarco, David Miller, Carol Christensen From EPA ORD: Darrell Winner, Christopher Zarba (on 1-year detail as Director of the Science Advisory Board), Rich Callan

I have asked the OPP attendees to send a draft agenda in advance and they said they would send it when it is available. Please let me know if you have other questions and the room where we would expect to meet.

Best regards,

Rich

---

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-----Original Message-----

From: rmw5@columbia.edu [mailto:rmw5@columbia.edu]

Sent: Tuesday, May 07, 2013 1:33 PM

To: "Callan, Richard" <Callan.Richard@epa.gov>; Anne Louise Oates

Cc: Frederica Perera; var1@columbia.edu; Howard Andrews

Subject: Re: Meeting with EPA

Hi Rich, the EPA meeting is coming up pretty soon so we were hoping you could get us a list of attendees. Among other things, we need to reserve appropriate space so need to know how many people are coming. Can you do that?? Thanks so much. Hope all is well. Best, Robin



**From:** Christensen, Carol  
**Sent:** Monday, May 13, 2013 11:57 AM  
**To:** Wolf, Joel  
**Cc:** Housenger, Jack; Lowit, Anna; Miller, David; Vogel, Dana; Dellarco, Vicki; Callan, Richard; Metzger, Michael  
**Subject:** External Panel Review materials to Docket  
**Attachments:** Chlorpyrifos Review Questions.pdf; Dr Basser.pdf; Dr Bitsko letter.pdf; Dr Chelonis letter.pdf; Dr Freund letter.pdf; Dr Liachenko letter.pdf; Final Panel\_names.pdf; MRI questions\_3.pdf; MRI Review v 3.pdf; MRI review\_1.pdf; MRI review\_2.pdf; MRI review\_3.pdf; MRI review\_4.pdf; Neurodevelopmental review\_1.pdf

Joel --

Per our email conversation last week, please post the attached 14 items regarding last summer's Federal external panel review of the chlorpyrifos children's study (epidemiology) to the chlorpyrifos docket.

Items include:

- List of questions (neurodevelopment and MRI panel (2))
- EPA review of MRI paper (1)
- Cover letters sent to each Federal review (5)
- Reviews received from each Federal reviewer (5)
- List of names of Federal reviewers (1)

Thanks in advance for your assistance.

Carol

### Questions for External Peer Review of MRI Paper

- 1) In April 2012, the FIFRA SAP<sup>1</sup>, an external review body designated by Congress to advise EPA concerning science policy issues, reviewed the epidemiology studies produced by researchers with the Columbia Center on Children's Environmental Health (CCCEH) regarding the relation between prenatal chlorpyrifos exposure and adverse neurodevelopmental consequences through childhood (FIFRA Scientific Advisory Panel, 2012). In May 2012, researchers with the CCCEH produced the paper under evaluation in this written peer review; the paper on brain abnormalities using MRI technology by (Rauh et al., 2012<sup>2</sup>). Because Rauh et al (2012) was available after the April 2012 SAP review, this study was not considered by the Panel. For the current peer review, EPA is soliciting comments on the epidemiological aspects of the study design which are unique to Rauh et al (2012) (e.g., sample selection and inclusion/exclusion criteria; socioeconomic status (SES) considerations; sample size and statistical power, etc.) EPA's has reviewed of the epidemiological context of the MRI study by Rauh et al (2012) (see attached). Please comment on the Agency's review with respect to the epidemiological aspects of the study.
- 2) The authors used sophisticated MRI imaging studies to measure difference in 3D size of cerebral surface and cortical thickness by chlorpyrifos exposure group (high/low). Please comment on the MRI imaging procedures. In addition to other issues you identify as relevant for EPA to consider, please include in your comments a consideration of the following:
  - a. Authors report that 20 of 28 eligible participants in the "high" exposure group were enrolled with usable MRIs, and 20 of 38 eligible participants in the "low" exposure group were enrolled with usable MRIs in the study. Is this a reasonable eligibility rate, *i.e.*, is the rate of lack of usable MRI remarkable in this study?
  - b. Did authors process and pre-process images appropriately according to standard practice in research studies? Were there deviations to common practice in MRI studies, and if so, what are the potential impacts on the interpretation of the findings?
  - c. Did authors use appropriate methods to categorize "grey matter" thickness by gradations of color of the cerebral cortex across the MRI images? If not, how could methods be improved and what are the implications?
  - d. Authors utilized a two-step process to identify an individual "template" brain against which to compare other brain images by CPF exposure status. Please comment as to the use of an individual versus an average or amalgamated "template."

- 3) Please comment on the statistical procedures used in Rauh et al (2012).

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<sup>1</sup> FIFRA Scientific Advisory Panel. (2012). Draft Issue Paper Scientific Issues Concerning the Health Effects of Chlorpyrifos.

<sup>2</sup> Rauh, V. A., Perera, F. P., Horton, M. K., Whyatt, R. M., Bansal, R., Hao, X., . . . Peterson, B. S. (2012). Brain anomalies in children exposed prenatally to a common organophosphate pesticide. *Proc Natl Acad Sci U S A*, 109(20), 7871-7876. doi: 1203396109 [pii] 10.1073/pnas.1203396109

- 4) The authors reported several findings (i.e., areas of brain enlargement, qualitative statistical interaction between full scale intelligence quotient (FSIQ) and brain morphology; aberrations in the normal sexual differentiation of the brain, and sporadic cortical thinning). Please provide your interpretation of the results reported by Rauh et al (2012). Based upon your interpretation of the study, what, if any, neurodevelopmental consequences would you anticipate in these children?
- 5) What are the uncertainties around the MRI imaging findings in Rauh et al (2012)? Child age range in the MRI study was 6-11 years. Are there changes in child brain development in this period of rapid brain growth that could affect study results and interpretation?
- 6) In the developmental neurotoxicity study conducted in laboratory rats (Hoberman, 1998a, 1998b, 1999a, 1999b<sup>3</sup>) EPA's Data Evaluation Review (DER) of this study, pp. 23-25 and 29 of DER for MRID 44556901 & pp. 3-7 and 13-15 of DER for MRID 44787301<sup>4</sup>], effects in brain morphometry were observed in rats exposed to chlorpyrifos during gestation. To what degree, if any, are the results of Rauh et al (2012) comparable with Hohmann?
- 7) What additional comments would you like to provide us that may assist us in better interpreting the results and characterizing the uncertainty?
- 8) Are there any additional analyses that should be conducted? And what would be the value or implications of these analyses?

---

<sup>3</sup> Hoberman, A. M. (1998a) Developmental neurotoxicity study of chlorpyrifos administered orally via gavage to Crl:CD®BR VAF/Plus® presumed pregnant rats. Argus Research Laboratories, Inc., Horsham, Pennsylvania, Laboratory study No. 304-001, Sponsor study No. K-044793-109, May 1, 1998. MRID 44556901. Unpublished.

Hoberman, A.M. (1998b) Developmental neurotoxicity study of chlorpyrifos administered orally via gavage to Crl:CD®BR VAF/Plus® presumed pregnant rats; Report Supplement 1 (pathology data). Argus Research Laboratories, Inc., Horsham, Pennsylvania, Laboratory study No. 304-001, Sponsor study No. K-044793-109, September 23, 1998. MRID 44661001. Unpublished.

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Hoberman, A.M. (1999b) Developmental neurotoxicity study of chlorpyrifos administered orally via gavage to Crl:CD®BR VAF/Plus® presumed pregnant rats; Report Supplement 2 - Reanalysis of Morphometric Data. Argus Research Laboratories, Inc., Horsham, Pennsylvania, Laboratory study No. 304-001, Sponsor study No. K-044793-109, March 19, 1999. MRID 44787301. Unpublished.

<sup>4</sup> Makris, S. Chlorpyrifos Toxicology Data Review.

### Questions for Federal Child Development Experts

1. Was the type of testing age appropriate and conducted correctly for the outcome measures of memory and IQ testing in children reported in the Columbia Mothers and Newborn Study as discussed in the papers by Rauh *et al.*, (2006 and 2011)? Are there population norms associated with these measures? If so, how can these be used to help characterize the findings in the (Rauh *et al.*, 2006 and 2011)?
2. For the outcome measures in the selected papers, how do the distributions compare to population norms or other studies using these outcome measures (memory, IQ) in the Columbia cohort? With respect to the domains that make up the outcome measures, how do they compare to population norms or other studies populations and are there domains which are considered to be the more/less important in cognitive development?
3. Were the tests used to measure the outcome valid and were they applicable to the research study question?
4. What are the uncertainties around the outcome measurements in this cohort? Are socio-economic status and other exposures adequately addressed?
5. What additional comments would you like to provide us that may assist us in better interpreting the results and characterizing the uncertainty?
6. Are there any additional analyses that should be conducted? And what would be the value or implications of these analyses?

**From:** Wolf, Joel  
**Sent:** Monday, May 13, 2013 12:09 PM  
**To:** Christensen, Carol  
**Cc:** Housenger, Jack; Lowit, Anna; Miller, David; Vogel, Dana; Dellarco, Vicki; Callan, Richard; Metzger, Michael  
**Subject:** RE: External Panel Review materials to Docket

Hi Carol,

I will submit these to the docket staff for posting. You may not see them in the docket until the end of this week or sometime next week. It usually takes a few days and they are currently working on posting the comments on the volatility assessment as well as any other chemicals that have had comments come in last week.

Best, Joel

---

**From:** Christensen, Carol  
**Sent:** Monday, May 13, 2013 11:57 AM  
**To:** Wolf, Joel  
**Cc:** Housenger, Jack; Lowit, Anna; Miller, David; Vogel, Dana; Dellarco, Vicki; Callan, Richard; Metzger, Michael  
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**Cc:** Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda, please review

Many thanks, Rich.  
Howard

-----Original Message-----

From: Callan, Richard [mailto:Callan.Richard@epa.gov]  
Sent: Monday, May 13, 2013 12:55 PM  
To: Howard Andrews; rmw5@columbia.edu; Frederica Perera; Anne Louise Oates; var1@columbia.edu  
Cc: Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda, please review

Hi Howard,

Thank you for your message. I've added those items to the agenda and it sounds like they should be at the start of the meeting, please see the attached and let me know if it looks OK to you and your colleagues.

Here are the participants from EPA's Office of Research and Development with job titles.

Darrell Winner, Ph.D.  
Acting Deputy Director, National Center for Environmental Research (NCER)

Christopher Zarba  
Acting Director, EPA Science Advisory Board (SAB) Staff Office

Rich Callan  
Project Officer, EPA/NIEHS Children's Centers Program, National Center for Environmental Research (NCER)

I have asked for the other information you requested and expect to have a response to you by COB today.

Best regards,

Rich

---

Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division National Center for Environmental Research Office of Research and Development U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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National Center for Environmental Research <http://www.epa.gov/ncer/>

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From: Howard Andrews [mailto:Andrews@nyspi.columbia.edu]

Sent: Friday, May 10, 2013 8:41 PM

To: Callan, Richard; rmw5@columbia.edu; Frederica Perera; Anne Louise Oates

Cc: var1@columbia.edu; Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon

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Howard F. Andrews, PhD  
Associate Clinical Professor of Biostatistics Director, Data Coordinating Center Columbia University Medical Center  
(212) 543 6022

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Job Titles:

Vicki Dellarco, Senior Science Advisor  
Office of Pesticide Programs

David J. Miller, Chief  
Toxicology and Epidemiology branch

Carol Christensen, epidemiologist  
Toxicology and Epidemiology Branch

Thanks

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**Sent:** Monday, May 13, 2013 2:47 PM  
**To:** Callan, Richard  
**Cc:** Dellarco, Vicki; Miller, David; Housenger, Jack  
**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Request from Columbia

Rich

The main purpose of our meeting Weds. is delineated in the agenda we forwarded last week, and the list of EPA questions/remaining uncertainties we share last month.

Although the bulk of the external review materials relate to EPA's evaluation of the Columbia MRI paper, we do not anticipate we would address issues regarding the MRI paper in great detail at the 5/15 meeting, however we are happy to provide copies to Columbia.

Thanks

Carol

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**Sent:** Monday, May 13, 2013 12:59 PM  
**To:** Christensen, Carol  
**Cc:** Housenger, Jack; Miller, David; Dellarco, Vicki; Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
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**To:** Callan, Richard  
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**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Request from Columbia

Rich

The Federal review was a letter-based review. We sent letters and questions out and received responses back from each of the 5 reviewers between July and September 2012. There is no report, the individual reviews are the total content of this external review.

Thanks

Carol

---

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Hi Carol,

Excellent, thank you, I will forward to them. Just a question -- they have asked for the date when the panel's report was issued. I'm thinking that the "EPA Review" in the "Summary and Critical Review" document would be equivalent to this, does that seem OK to you? If so, it doesn't seem to have a date on it so is there a date when this document was finalized?

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US EPA, 2777 South Crystal Drive (Potomac Yard One), Room S-11937, Arlington, VA 22202 Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P, Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

-----Original Message-----

From: Callan, Richard  
Sent: Tuesday, May 07, 2013 2:01 PM  
To: rmw5@columbia.edu; "Callan, Richard" <Callan.Richard@epa.gov>; Anne Louise Oates  
Cc: Frederica Perera; var1@columbia.edu; Howard Andrews  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m.

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From EPA OPP: Vicki Dellarco, David Miller, Carol Christensen From EPA ORD: Darrell Winner, Christopher Zarba (on 1-year detail as Director of the Science Advisory Board), Rich Callan

I have asked the OPP attendees to send a draft agenda in advance and they said they would send it when it is available. Please let me know if you have other questions and the room where we would expect to meet.

Best regards,

Rich

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**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Response to questions from Columbia Children's Center  
**Attachments:** Neurodevelopmental review\_1.pdf; Chlorpyrifos Review Questions.pdf; Dr Basser.pdf; Dr Bitsko letter.pdf; Dr Chelonis letter.pdf; Dr Freund letter.pdf; Dr Liachenko letter.pdf; Final Panel\_names.pdf; MRI questions\_3.pdf; MRI Review v 3.pdf; MRI review\_1.pdf; MRI review\_2.pdf; MRI review\_3.pdf; MRI review\_4.pdf; columbia questions final clean.docx; Agenda for May 15th 2013 Meeting Columbia CCCEH and EPA 051313.docx

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Associate Clinical Professor of Biostatistics Director, Data Coordinating Center Columbia University Medical Center  
(212) 543 6022

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Hi Rich,

Thanks so much for pulling all of the federal review material together—this will be very helpful.

One follow up question: In MRI review\_1.pdf, the reviewer refers to a *Summary and Critical Review of Rauh et al. 2012*. And there is a reference to an "EPA Review" in MRI review\_4.pdf. I'm not sure if these are references to the same or different documents, but would it be possible to get us copies of this review material?

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**Attachments:** MRI Review v 3.pdf

Hi Howard,

The *Summary and Critical Review* document was among the attachments to yesterday's message and the "EPA Review" is contained in there starting on p. 6 – the filename is "MRI Review v 3.pdf." It is attached to this message as well.

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**From:** Howard Andrews [mailto:Andrews@nyspi.columbia.edu]  
**Sent:** Tuesday, May 14, 2013 9:56 AM  
**To:** Callan, Richard; Frederica Perera; rmw5@columbia.edu; var1@columbia.edu; Anne Louise Oates  
**Cc:** Johnson, Jim; Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Response to questions from Columbia Children's Center

Hi Rich,

Thanks so much for pulling all of the federal review material together—this will be very helpful.

One follow up question: In MRI review\_1.pdf, the reviewer refers to a *Summary and Critical Review of Rauh et al. 2012*. And there is a reference to an "EPA Review" in MRI review\_4.pdf. I'm not sure if these are references to the same or different documents, but would it be possible to get us copies of this review material?

Thanks again,

Howard

**From:** Callan, Richard [mailto:Callan.Richard@epa.gov]

**Sent:** Monday, May 13, 2013 7:05 PM

**To:** Howard Andrews; Frederica Perera; [rmw5@columbia.edu](mailto:rmw5@columbia.edu); [var1@columbia.edu](mailto:var1@columbia.edu); Anne Louise Oates

**Cc:** Johnson, Jim; Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon

**Subject:** RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Response to questions from Columbia Children's Center

Hi Howard,

Here is the material you requested, an updated agenda for Wednesday's meeting and the list of questions from the Office of Pesticide Programs (sent to you on April 12<sup>th</sup> and included here for easy reference). Please note that the main purpose of the meeting for EPA is in the agenda items and the list of EPA questions and remaining uncertainties ("key issues").

Here are responses to your questions.

(1) The "federal review and "2012 federal review" in the "key issues" document sent on April 12<sup>th</sup> and the "external review" in the email all refer to the same process. Our office (NCER) was unaware of this review until we received the "key issues" document shortly before it was forwarded to you.

(2) You requested information about the external reviewers, the questions from EPA and the responses provided by the reviewers. Please see the 14 .pdf attachments to this email, here is a list of what is included.

- (a) List of questions, chlorpyrifos/neurodevelopment review and MRI publication review (2 files)
- (b) EPA summary and critical review of MRI paper (1)
- (c) Cover letters sent to each Federal reviewer (5)
- (d) Reviews received from each Federal reviewer (5)
- (e) List of names of Federal reviewers (1)

Please note that although the bulk of the external review materials relate to EPA's evaluation of Columbia MRI paper (Rauh et al. 2012), OPP does not anticipate addressing issues regarding this publication in great detail at the meeting. Also please note that all of these documents have been sent for posting to the public docket for chlorpyrifos registration review and are expected to be available there within the next week or so (see [http://www.epa.gov/oppsrrd1/registration\\_review/chlorpyrifos/](http://www.epa.gov/oppsrrd1/registration_review/chlorpyrifos/)).

(3) You asked to provide the date the panel was convened and the date the panel's report was issued. Carol Christensen at OPP said all of the questions and responses were by individual letters sent out by OPP and responses received from the 5 reviewers between July and September 2012, so the individual reviews are the total content of the external review so there was no panel meeting and there is no separate report.

(4) As requested, here are the job titles of each of the individuals who will be coming to the meeting next week.

From EPA's Office of Pesticide Programs (OPP):

Vicki Dellarco, Senior Science Advisor  
Office of Pesticide Programs

David J. Miller, Chief  
Toxicology and Epidemiology Branch, Health Effects Division

Carol Christensen, Epidemiologist  
Toxicology and Epidemiology Branch, Health Effects Division

From EPA's Office of Research and Development (ORD):

Darrell Winner  
Acting Deputy Director, National Center for Environmental Research (NCER)

Christopher Zarba  
Acting Director, EPA Science Advisory Board (SAB) Staff Office (on detail from the Office of Research and Development)

Rich Callan  
Environmental Health Scientist and Project Officer, EPA/NIEHS Children's Centers Program, National Center for Environmental Research (NCER)

Please let me know if you have any additional questions. We look forward to seeing you and your colleagues at the meeting on Wednesday.

Best regards,

Rich

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Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division  
National Center for Environmental Research  
Office of Research and Development  
U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P, Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

-----Original Message-----

From: Howard Andrews [<mailto:Andrews@nyspi.columbia.edu>]  
Sent: Monday, May 13, 2013 1:25 PM  
To: Callan, Richard; [rmw5@columbia.edu](mailto:rmw5@columbia.edu); Frederica Perera; Anne Louise Oates; [var1@columbia.edu](mailto:var1@columbia.edu)  
Cc: Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda, please review

Many thanks, Rich.  
Howard

-----Original Message-----

From: Callan, Richard [<mailto:Callan.Richard@epa.gov>]  
Sent: Monday, May 13, 2013 12:55 PM  
To: Howard Andrews; [rmw5@columbia.edu](mailto:rmw5@columbia.edu); Frederica Perera; Anne Louise Oates; [var1@columbia.edu](mailto:var1@columbia.edu)

Cc: Winner, Darrell; Zarba, Christopher; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda, please review

Hi Howard,

Thank you for your message. I've added those items to the agenda and it sounds like they should be at the start of the meeting, please see the attached and let me know if it looks OK to you and your colleagues.

Here are the participants from EPA's Office of Research and Development with job titles.

Darrell Winner, Ph.D.  
Acting Deputy Director, National Center for Environmental Research (NCER)

Christopher Zarba  
Acting Director, EPA Science Advisory Board (SAB) Staff Office

Rich Callan  
Project Officer, EPA/NIEHS Children's Centers Program, National Center for Environmental Research (NCER)

I have asked for the other information you requested and expect to have a response to you by COB today.

Best regards,

Rich

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Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division National Center for Environmental Research Office of Research and Development U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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US EPA, 2777 South Crystal Drive (Potomac Yard One), Room S-11937, Arlington, VA 22202 Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P, Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

-----Original Message-----

From: Howard Andrews [mailto:Andrews@nyspi.columbia.edu]  
Sent: Friday, May 10, 2013 8:41 PM  
To: Callan, Richard; rmw5@columbia.edu; Frederica Perera; Anne Louise Oates  
Cc: var1@columbia.edu; Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda

Hi Rich,

Thank you for the agenda and for the information about the "external review". Just to clarify: two of the items in the document that was sent on April 12th refer to a "federal review" and one item refers to a "2012 federal review". Are these three items that came out of the "external review" referred to in your e-mail? That is, do all of these terms refer to

the same process? We are seeking clarification because prior to your e-mail, we were unaware that the external review you describe had taken place.

In order for us to be able to discuss issues related to the external review, we will need to have a copy of the entire list of EPA questions and all responses provided by the external reviewers. Also, can you please tell us: a) who served on the external review panel, b) the affiliations and job titles of these individuals, and c) the date that the panel was convened, and the date the panel's report was issued?

In response to your invitation, we would like to add two items to the agenda:

- 1) Review of Columbia responses to previous EPA queries, invited presentations made to EPA, and participation in SAPs
- 2) Epidemiological assessment of pesticide effects: overview

And a last request: can you please provide the job titles of each of the individuals who will be coming to the meeting next week?

Thanks,  
Howard

Howard F. Andrews, PhD  
Associate Clinical Professor of Biostatistics Director, Data Coordinating Center Columbia University Medical Center  
(212) 543 6022

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From: Callan, Richard [Callan.Richard@epa.gov]  
Sent: Thursday, May 09, 2013 5:35 PM  
To: rmw5@columbia.edu; Frederica Perera; Anne Louise Oates  
Cc: var1@columbia.edu; Howard Andrews; Winner, Darrell; Li, Sylvana; Payne-Sturges, Devon  
Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m. -- Draft Agenda

Hi Robin,

We have been sent a draft agenda from OCSPP for next Wednesday's meeting and it is attached. Please let us know if there are any items that you would like to add.

The agenda and the questions that were sent earlier include a reference to an "external review." Carol Christensen at OCSPP says this was conducted to address some of the outstanding concerns raised at the SAP meeting about the neurodevelopment testing and questions regarding the MRI publication which became available after the meeting. She says the EPA questions and responses they received will soon be available in the public docket.

Best regards,

Rich

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Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division National Center for Environmental Research Office of Research and Development U.S. Environmental Protection Agency  
Phone: 703-347-8051 Fax: 703-347-8140

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National Center for Environmental Research <http://www.epa.gov/ncer/>

-----Original Message-----

From: Callan, Richard

Sent: Tuesday, May 07, 2013 2:01 PM

To: [rmw5@columbia.edu](mailto:rmw5@columbia.edu); "Callan, Richard" <[Callan.Richard@epa.gov](mailto:Callan.Richard@epa.gov)>; Anne Louise Oates

Cc: Frederica Perera; [var1@columbia.edu](mailto:var1@columbia.edu); Howard Andrews

Subject: RE: Meeting with EPA on Wednesday, May 15th, 2013, 12:00 noon to 3:00 p.m.

Hi Robin,

As far as I know at this point, there will be 3 attendees from our Office of Pesticide Programs (OPP) plus 3 staff from the Office of Research and Development. This is the list of the people we expect:

From EPA OPP: Vicki Dellarco, David Miller, Carol Christensen From EPA ORD: Darrell Winner, Christopher Zarba (on 1-year detail as Director of the Science Advisory Board), Rich Callan

I have asked the OPP attendees to send a draft agenda in advance and they said they would send it when it is available. Please let me know if you have other questions and the room where we would expect to meet.

Best regards,

Rich

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Rich Callan, MPH

Environmental Health Scientist

Health Research and Fellowships Division National Center for Environmental Research Office of Research and

Development U.S. Environmental Protection Agency

Phone: 703-347-8051 Fax: 703-347-8140

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National Center for Environmental Research <http://www.epa.gov/ncer/>

-----Original Message-----

From: [rmw5@columbia.edu](mailto:rmw5@columbia.edu) [<mailto:rmw5@columbia.edu>]

Sent: Tuesday, May 07, 2013 1:33 PM

To: "Callan, Richard" <[Callan.Richard@epa.gov](mailto:Callan.Richard@epa.gov)>; Anne Louise Oates

Cc: Frederica Perera; [var1@columbia.edu](mailto:var1@columbia.edu); Howard Andrews

Subject: Re: Meeting with EPA

Hi Rich, the EPA meeting is coming up pretty soon so we were hoping you could get us a list of attendees. Among other things, we need to reserve appropriate space so need to know how many people are coming.

Can you do that?? Thanks so much. Hope all is well. Best, Robin



Callan, Richard

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**From:** Christensen, Carol  
**Sent:** Tuesday, May 14, 2013 11:41 AM  
**To:** Callan, Richard  
**Subject:** details and logistics

Hi Richard –

I am looking forward to our trip tomorrow, and thanks for your help in setting it up.

I believe Dr. Andrews asked for the chlorpyrifos docket link. Although the external review materials may not be in there yet (you may forward the attachments I sent yesterday if you've not already done so), other items including a meeting (8/21/12) between EPA and Dow AS concerning the EPA's use of epidemiology data are also in there. The link is here: info <http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2008-0850-0113>.

For tomorrow, my cell phone number is [REDACTED] in case we need to connect. I believe we will all meet at the Union Station waiting area for train #172 by 7:15 am, train departs 7:25. I think one of us should spearhead coordinating some logistics to ensure we all end up on the train together. Would you prefer to do that?

Thanks for your help.

Carol

**From:** Dellarco, Vicki  
**Sent:** Tuesday, May 14, 2013 6:28 PM  
**To:** Callan, Richard  
**Subject:** Re: Meeting with Columbia Center for Children's Environmental Health --  
Wednesday, May 15th, 2013 -- Updated Agenda and Transportation

Richard

If you are still at work, Can you bring a couple copies of new agenda with you. Thanks Vicki

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**From:** Callan, Richard  
**Sent:** Tuesday, May 14, 2013 6:14:06 PM  
**To:** Christensen, Carol; Miller, David; Dellarco, Vicki; Winner, Darrell; Zarba, Christopher  
**Cc:** Housenger, Jack; Li, Sylvana; Payne-Sturges, Devon  
**Subject:** Meeting with Columbia Center for Children's Environmental Health -- Wednesday, May 15th, 2013 -- Updated Agenda and Transportation

Hi All,

Attached please find the updated agenda incorporating the request from Columbia to add a couple of items, and the logistics for tomorrow's trip. The group leaving from Union Station can meet at the designated track for train #172 at 7:15 a.m. and hopefully we can find seats together on the train. Darrell will be joining us at New Carrollton and Chris will join us at BWI.

**Date:** Wednesday, May 15<sup>th</sup>  
**Time:** 12:00 – 3:00 p.m.  
**Location:** Columbia University, Mailman School of Public Health  
722 West 168<sup>th</sup> Street, 11<sup>th</sup> floor, EHS Conference Room 1101  
New York, NY 10032

**Map:** <http://goo.gl/maps/HVrbW>  
**Contact number:** (212) 304-7280

**Transportation:** Amtrak – from Union Station, DC to Penn Station, NYC  
Train #172 – Departs 7:25 a.m., Arrives 10:44 a.m. Duration: 3 hr, 19 min.  
Note that Amtrak procedures call for closing the gate about 5 minutes before the train leaves the station  
(at 7:20 a.m.). <http://tickets.amtrak.com/itd/amtrak>

Penn Station to Meeting Location:

We can go from Penn Station to 168<sup>th</sup> Street in 2 taxis or by subway. The taxis would go via the West Side Highway and should take about 25 minutes and the fare would be about \$25.

The 168<sup>th</sup> Street subway stop (via the A, C or 1 train) is about 2 blocks from the building where the meeting room is located and would take about 25 minutes.

Subway from 34th St – Penn Station – A (Express) Train

Take the 207th Street-Inwood-bound train departing at 11:00 a.m.

Destination: 168th St. – Washington Heights A/C station – scheduled arrival: 11:23 a.m. Fare:

\$2.50

MTA website: [http://tripplanner.mta.info/MyTrip/ui\\_web/customplanner/tripplanner.aspx](http://tripplanner.mta.info/MyTrip/ui_web/customplanner/tripplanner.aspx)

My BlackBerry phone is (202) 407-1233 if you need to call or send a text.

Meeting Agenda

- 1) Introductions
- 2) Review of Columbia responses to previous EPA queries, invited presentations made to EPA, and participation in SAPs (Columbia)
- 3) Epidemiological assessment of pesticide effects: Overview (Columbia)
- 4) Relevance and Importance of CCCEH Data to EPA Human Health Risk Assessment (EPA/OPP)
- 5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (Please refer to EPA Questions sent April 2013) (EPA/OPP)
- 6) Wrap-Up and Next Steps (All)

Best regards,

Rich

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Rich Callan, MPH  
Environmental Health Scientist  
Health Research and Fellowships Division  
National Center for Environmental Research  
Office of Research and Development  
U.S. Environmental Protection Agency  
Phone: 703-347-8051 Mobile: 202-407-1233

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Mailing Address (can take a month for delivery): 1200 Pennsylvania Avenue NW, Mail Code 8723P, Washington, D.C. 20460-0001

National Center for Environmental Research <http://www.epa.gov/ncer/>

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Meeting with EPA/NIEHS Columbia Center for Children's Environmental Health  
Investigators and Staff, Staff from EPA Office of Pesticide Programs (OPP) and EPA Office  
of Research and Development (ORD)

Wednesday, May 15<sup>th</sup> 2013, 12:00 p.m.

Columbia University Mailman School of Public Health, 722 West 168<sup>th</sup> Street, New York, NY  
11<sup>th</sup> floor, EHS Conference Room 1101 (Phone: 212-304-7280)

## Agenda

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- 1) Introductions
- 2) Review of Columbia responses to previous EPA queries, invited presentations made to EPA, and participation in SAPs (Columbia)
- 3) Epidemiological assessment of pesticide effects: Overview(Columbia)
- 4) Relevance and Importance of CCCEH Data to EPA Human Health Risk Assessment (EPA/OPP)
- 5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (Please refer to EPA Questions sent April 2013) (EPA/OPP)
- 6) Wrap-Up and Next Steps (All)

**COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**Meeting with EPA/NIEHS Columbia Center for  
Children's Environmental Health (CCCEH) Investigators  
and  
Staff from EPA Office of Pesticide Programs (OPP) and  
EPA Office of Research and Development (ORD)**

Wednesday, May 15<sup>th</sup> 2013, 12:00 PM

Columbia University  
Mailman School of Public Health,  
722 West 168<sup>th</sup> Street, New York, NY

**COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

## Agenda

- 1) Introductions
- 2) Review of Columbia responses to previous EPA queries, invited presentations made to EPA, and participation in SAPs (Columbia)
- 3) Epidemiological assessment of pesticide effects: Overview (Columbia)
- 4) Relevance and Importance of CCCEH Data to EPA Human Health Risk Assessment (EPA/OPP)
- 5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)
- 6) Wrap-Up and Next Steps

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**COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

## Introductions (1a)

- **EPA Office of Pesticide Programs (OPP)**
  - Vicki Dellarco, Senior Science Advisor
  - David J. Miller, Chief, Toxicology and Epidemiology Branch, Health Effects Division (TEB/HED)
  - Carol Christensen, Epidemiologist (TEB/HED)
- **EPA Office of Research and Development (ORD)**
  - Darrell Winner, Acting Deputy Director, National Center for Environmental Research (NCER)
  - Christopher Zarba, Acting Director, EPA Science Advisory Board (SAB)
  - Rich Callan, Environmental Health Scientist and Project Officer, EPA/NIEHS Children's Centers Program, (NCER)

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**COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

## Introductions (1b)

**Columbia University Center for Children's Environmental Health (CCCEH) at the Mailman School of Public Health (MSPH)**

- **Frederica Perera**, CCCEH Director and Professor of Environmental Health Sciences
- **Robin Whyatt**, CCCEH Co-Director and Professor of Clinical Environmental Health Sciences
- **Virginia Rauh**, Co-Director and Professor of Clinical Population and Family Health
- **Howard Andrews**, Director, Columbia University Medical Center Data Coordinating Center and Associate Clinical Professor of Biostatistics
- **Anne Louise Oates**, Associate General Counsel, Columbia University

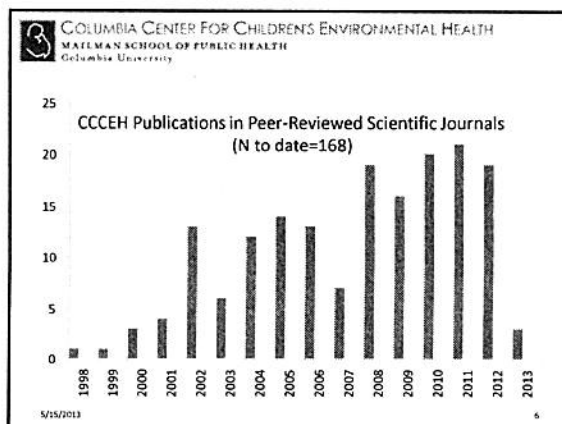
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**COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

## 2) Review of Columbia responses to previous EPA chlorpyrifos (CPF) queries, presentations to EPA, and participation in EPA Scientific Advisory Panels (SAPs): 2008 - 2013

- April 24, 2008: Virginia Rauh provides detailed response to 2/28/2008 query from Dow.
- May 29, 2008: In response to EPA queries, Robin Whyatt performs analyses and provides an Excel file with year by year chlorpyrifos summary statistics for air, maternal blood and umbilical cord measures, including geometric means.
- July 27-28, 2008: Robin Whyatt and Virginia Rauh conduct analyses and each provides a Powerpoint presentation to be distributed to the SAP.
- July 31, 2008: EPA staff thanks Robin Whyatt for review and input with respect to an EPA report titled Appendix D: Human Epidemiology: Effects in Children (prepared by OPP Health Effects Division), which includes a section on epidemiological studies conducted by Columbia University.
- September 24, 2008: Virginia Rauh, Robin Whyatt and Howard Andrews attend EPA Scientific Advisory Panel meeting on September 24. At EPA request, Robin and Virginia give presentations and respond to comments by Dow representatives.
- November 18, 2008: Virginia Rauh responds to Dow 11/3/2008 report.
- April 21, 2009: Webinar presentation to EPA staff by Robin Whyatt and Virginia Rauh.
- January-February, 2010: Columbia conducts extensive analyses in response to SAP queries summarized by EPA and sent to Virginia Rauh and Robin Whyatt on 1/28/2010. Detailed findings and summary responses to the SAP queries (signed by Perera, Rauh, Whyatt and Andrews and dated 2/19/2010) are sent to EPA on 2/22/2010.
- March 8, 2010: Columbia responds to Dow queries forwarded by EPA staff.
- January 24, 2013: Analyses performed by Columbia and detailed report provided in response to 11/8/2012 queries from EPA.

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**3a) Epidemiological Assessment of Pesticide Effects: Overview**

- Collection of data from multiple domains
  - Demographics
  - Personal Background (social indicators)
  - Neighborhood Characteristics (GIS)
  - Exposures (biological and environmental samples)
  - Perinatal Outcomes (birth weight, length etc)
  - Health/Developmental Outcomes (BMI, IQ etc)


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MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**3b) Epidemiological Assessment of Pesticide Effects: Overview**

- Each analysis requires multiple steps
  - Identification of predictor (exposure), outcomes, covariates, potential confounders
  - Decisions regarding level of measurement, e.g. continuous vs dichotomous exposures/outcomes
  - Sample selection (children, time periods etc)
  - Identification & selection of required data fields
  - Programming to create derived variables
  - Programming to derive appropriate exposure data, incorporating flags and indicators


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MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**3c) Epidemiological Assessment of Pesticide Effects: Overview**


- Modeling
  - Regression analysis to adjust for effects of covariates and potential confounding variables
  - Assessing effects of measures over time requires specialized statistical procedures (e.g. General Estimating Equation--GEE)
  - Identification & selection of required data fields
  - Programming to create derived variables
  - Programming to derive appropriate exposure data, incorporating flags and indicators
  - Model review, adjustment, finalization

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Columbia University

**4) Relevance and Importance of CCCEH Data to EPA Human Health Risk Assessment (EPA/OPP)**

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MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**1) Further analysis of other chemical exposures (e.g., lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes**

**a) 2012 SAP--** "it should be noted that it cannot be stated that chlorpyrifos is the sole contributor to the observed outcomes."

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 COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**1) Further analysis of other chemical exposures (e.g., lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes**

- b) 2012 SAP-- "In an earlier examination of the same cohort, Perera et al. (2009) reported an association between a decrease in full-scale IQ and verbal IQ in 5-year-olds with prenatal polycyclic aromatic hydrocarbons (PAH) exposure rather than chlorpyrifos, thus, raising an issue of the shift in chemical exposure association with increase in age. In each of these analyses, statistical modeling showed that the exposures were independently associated with IQ, and no significant interaction was observed with the other chemical. While this is a statistically sound approach to determine independent responses, panel members noted that it is very difficult to identify the independent physiological effects of a single chemical in this type of multi-chemical exposure scenario."

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 **COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**1) Further analysis of other chemical exposures (e.g., lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes**

**c) 2012 Federal Peer Review** -- "even low levels of lead can impact neurodevelopment, and even that the observed neurobehavioral deficits are more pronounced at lower blood lead levels when compared with higher blood lead levels".

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 **COLUMBIA CENTER FOR CHILDREN'S ENVIRONMENTAL HEALTH**  
MAILMAN SCHOOL OF PUBLIC HEALTH  
Columbia University

**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**1) Further analysis of other chemical exposures (e.g., lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes**

**d) 2008 SAP** -- "In order to eliminate the possible causes of neurodevelopmental effects by other pesticides in the Columbia study, it is suggested that EPA should repeat the pre-post residential cancellation analysis done for chlorpyrifos using other pesticide measurements, such as malathion diacid (MDA), a specific metabolite of malathion. The outcomes from those additional analyses will either confirm or reject EPA's preliminary conclusion that chlorpyrifos is likely to play a role in the neurodevelopmental outcomes."

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**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**1) Further analysis of other chemical exposures (e.g., lead, PAHs, other pesticides) to address, if possible, their impact or contribution as modulating factors on the measured outcomes**

**e) 2008 SAP** -- "It would be useful to examine the results of a statistical analysis that includes all three AChE-inhibiting insecticides in the analysis model as dichotomous variables (above or below LOD) in combination with continuous measurements for these variables. This type of analysis would likely not change the results, but it could be helpful in illustrating threshold or dose response effects."

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**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**2) Further analysis and information to address and, if possible, better characterize uncertainty around outcome measures on learning/memory/IQ**

**a) 2012 SAP** -- Alternative considerations for non-quantified samples: "little use was made of techniques to integrate non-quantified samples into the statistical test.... Various methods were reviewed by the July 2010 SAP that can be applied to either normally or lognormally distributed data that include a significant (even a majority) of non-detectable sample.... Specifically, the use of 'probability plots' was described that can yield an estimate of the geometric mean of the distribution [GM], the geometric standard deviation [GSD], and corresponding percentiles."

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**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

**2) Further analysis and information to address and, if possible, better characterize uncertainty around outcome measures on learning/memory/IQ**

**b) 2012 SAP** -- Federal Peer Review -- "There is a scatterplot showing the raw scores for overall IQ and for each of the subtests, but it is not possible to obtain the necessary information to compare the distributions of these scores with the norms for the test or with any other study sample. Ideally, the means and standard deviations for these scores should be presented for either a non-exposed or a non-exposed combined with low exposed group and these should be compared to a moderate or high-exposed group as was done for the BSID-II in the Rauh et al., 2006 paper. Here the uncertainties stem from the assumptions that are made when regression analyses are performed. The main issue here is that outliers can greatly influence the slope of the function."

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**2) Further analysis and information to address and, if possible, better characterize uncertainty around outcome measures on learning/memory/IQ**

**c) Federal Peer Review** -- A between group analysis using inferential statistics, as was done for the Bayley Scales of Infant Development II in the Rauh et al., 2006 paper, should be performed on each variable in both studies (i.e., the Child Behavior Checklist in Rauh et al., 2006, and the full scale IQ and subscales for the WISC-IV in the Rauh et al., 2011 study). This would be the most direct and least problematic method for determining whether exposure to chlorpyrifos resulted in significant decreases in IQ or significant increases in behavioral problems "..... no information was provided regarding the qualifications of the individuals who administered and scored the tests."

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**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

3) Further analysis to assess, if possible, whether individual cohort members had the potential for exposure to chlorpyrifos and/or other acetylcholinesterase (AChE) inhibiting pesticides (e.g., diazinon, propoxur), prenatally and /or post-natally, at levels leading to greater than 10% AChE inhibition (the level used to derive the regulatory point of departure).

- a) 2012 SAP-- recommended conducting a dose reconstruction analysis—"data on the concentration of chlorpyrifos in various media (i.e. house dust, air and water) while market basket data exists on the concentration of chlorpyrifos on food. These data provide the main tools for developing an effective exposure assessment and a subsequent reconstruction of potential dose." The agency has begun such analysis but the current draft analysis is limited without data on the exposure information relevant to individual women such that environmental chlorpyrifos exposure can then be linked to measures of blood chlorpyrifos.

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**5) Outstanding Questions Raised in External Review and CCCEH Data (published and unpublished) to Inform Responses (refer to EPA Questions sent April 2013) (EPA/OPP)**

3) Further analysis to assess, if possible, whether individual cohort members had the potential for exposure to chlorpyrifos and/or other acetylcholinesterase (AChE) inhibiting pesticides (e.g., diazinon, propoxur), prenatally and /or post-natally, at levels leading to greater than 10% AChE inhibition (the level used to derive the regulatory point of departure).

- b) 2012 SAP-- recommended the agency consider issues related to multiple chemical exposure (i.e., mixtures) to chlorpyrifos and other key AChE inhibiting pesticides identified by the Columbia University studies (diazinon, propoxur). Assumptions of co-exposure will likely be grossly overestimated without access to the raw data; such raw data may enable the agency to evaluate actual co-exposure information for individuals from air monitoring samples and blood samples. "

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**6) Wrap-Up and Next Steps**

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Callan, Richard

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**From:** Christensen, Carol  
**Sent:** Wednesday, May 22, 2013 2:05 PM  
**To:** Callan, Richard  
**Subject:** notes  
**Attachments:** EPA\_CCCEH meeting\_5\_15\_13\_main points..docx

## Summary CCCEH-EPA Meeting 5/15/13

### New Information:

- A. Dose Reconstruction: EPA can contact NYC DOH/housing for linked data set CCCEH and NYC housing pesticide application records 1998-2002 [Wendy McKelvey 212.676.2603 [wmckelveehealth@nyc.gov](mailto:wmckelveehealth@nyc.gov)]
- B. Lead: EPA could ask CCCEH for additional analysis age of housing (Pb surrogate) and CPF to provide evidence for/against association CPF and Pb(housing age)
- C. Lead: ND Domains affected differ: V. Rauh stated while Pb and CPF both affect ND – the two compounds affect ND differently. Pb-aggression, impulse control – outward motivated. CPF- working memory, attention, focus – inward processing and organization issues.
- D. Lead: Brain Imprint differs: See paper on MRI-Pb exposure compared to Rauh 2012 MRI CPF, illustrate areas of brain affected different. [Cecil et al. 2008]
- E. Other: Other items included in EPA list of questions/issues either addressed with published or previously provided information, or authors discussed factors against utility of pursuing SAP motivated analyses.

### Main Points:

- 1. Exposure Information:
  - a. EPA can contact NYC DOH/housing for linked data set CCCEH and NYC housing pesticide application records 1998-2002 [Wendy McKelvey 212.676.2603 [wmckelveehealth@nyc.gov](mailto:wmckelveehealth@nyc.gov)]
  - b. EPA can ask CCCEH for 'greyed out' pesticide product name; unlikely useful (quality)
  - c. R. Whyatt did previously performed an analysis assuming highest air concentration and back-calculated (crude) to about 10% the dose level needed to observe ChE inhibition – can send on request
  - d. D. Hattis PBPK submitted to Risk Analysis – upon publication, review and ask to speak with Hattis concerning CCCEH exposure data
  - e. Whyatt and Bradman paper on pesticide exposure assessment issues – difficulty in obtain pesticide product name from family participants – general information on obtaining pesticide use information
- 2. Lead:
  - a. EPA could ask CCCEH for additional analysis age of housing (Pb surrogate) and CPF to provide evidence for/against association CPF and Pb(housing age)
  - b. ND Domains affected differ between CPF and lead: V. Rauh stated while Pb and CPF both affect ND – the two compounds affect ND differently. Pb-aggression, impulse control – outward motivated. CPF- working memory, attention, focus – inward processing and organization issues.
  - c. Brain Imprint differs between CPF and Lead: See paper on MRI-Pb exposure compared to Rauh 2012 MRI CPF, illustrate areas of brain affected different. [Cecil et al. 2008]
  - d. Authors and group reviewed evidence regarding confounding effect lead:

1. See paper Rauh and Arunajadai 2012– these issues addressed
- iii. Alternative data presentation idea:
  1. Average IQ score by CPF category, test for statistical significance of difference
    - a. Authors state this data presentation/analysis less statistically robust and less informative than method published.
  2. EPA can request this analysis, however per above, likely low value.
- b. Secular change (and not CPF) causes change in health outcomes pre-/post-ban: EPA may request stratified analysis of PAH on Bayley outcomes, before and after 2001 to show no difference by strata. Supporting evidence that indeed CPF and not another coincident secular event that causes difference in CPF before and after (Whyatt et al. 2004, Table 4)
  - i. Authors state that if this true, would expect to see an effect in early period with other environmental chemicals tested; this is not the case.
  - ii. What if it does not show what is anticipated, due to statistical anomalies in dataset- then what? Re-consider this request.
  - iii. This is considered low utility, and was confusing to CCCEH researchers
- c. Qualifications of ND test administrators:
  - i. See meeting transcript 2008 SAP – response to DAS question on this point. Full information provided.